



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,637	04/20/2004	Charles Lynn Chidester	14374.54	5324

7590 11/01/2005
ERIC L. MASCHOFF
WORKMAN, NYDEGGER & SEELEY
1000 Eagle Gate Tower
60 East South Temple
Salt Lake City, UT 84111

EXAMINER

SUCHECKI, KRYSZYNA

ART UNIT	PAPER NUMBER
----------	--------------

2882

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/828,637

Applicant(s)

CHIDESTER, CHARLES LYNN

Examiner

Krystyna Suchecki

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-24 and 26-29 is/are rejected.
- 7) ☒ Claim(s) 3 and 25 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>08/26/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

Claims 12, 23 and 29 are objected to because of the following informalities:

Claim 12 would more clearly encompass the embodiment of Figures 7A and 7B if recited "wherein the filament comprises a helically wound wire, the wire having at least two different diameters". The current language implies that it requires a wire to be wound helically, and can be interpreted as having a helix with two different diameters.

Claim 23 is objected to since it is not clear if Claim 23 is an "intended use" claim or if the filament is actually in a slot of a cathode. For examination purposes, an "intended use" claim will be assumed, such that a filament is disposable in a slot of a cathode. Claim 29 repeats the limitation "wherein the slot is". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4, 7, 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Kujirai (US 6,333,969).

Regarding Claim 1, Kujirai teaches an x-ray tube comprising: (a) a vacuum enclosure (13); (b) means for emitting electrons (Figure 6) according to a predetermined emission profile, the means for emitting electrons according to a predetermined emission profile being substantially disposed within the vacuum enclosure (Column 10,

Art Unit: 2882

lines 47-54); and (c) an anode (15) positioned within the vacuum enclosure so as receive electrons emitted by the means for emitting electrons according to a predetermined emission profile.

Regarding Claim 2, Kujirai teaches the x-ray tube as recited in Claim 1, wherein the means for emitting electrons according to a predetermined emission profile comprises a filament (21a) and a cathode cup (14) including two walls (221, 222) which cooperate to at least partially define a slot wherein the filament is at least partially disposed, a distance between the filament and the at least one wall varying along at least a portion of the longitudinal length of the filament (Figures 7 and 11a).

Regarding Claim 4, Kujirai teaches the x-ray tube as recited in Claim 2, wherein the distance (W2) between the filament and at least one of the at least two walls is at a maximum proximate at least one end portion of the filament (Figure 11a).

Regarding Claim 7, Kujirai teaches the x-ray tube as recited in Claim 2, wherein the slot defines a cross- section having a least two different widths (Figure 7).

Regarding Claim 9, Kujirai teaches the x-ray tube as recited in Claim 2, wherein the means for emitting electrons according to a predetermined emission profile comprises a cathode cup including two walls which cooperate to at least partially define a slot, the slot having a cross sectional area that varies along at least a portion of a length of the slot (Figure 7).

Regarding Claim 10, Kujirai teaches the x-ray tube as recited in claim 1, wherein the means for emitting electrons according to a predetermined emission profile produces an emission profile wherein a density of emitted electrons per unit area is

Art Unit: 2882

substantially uniform throughout a predefined plane through which a substantial portion of the emitted electrons pass (Column 10, lines 47-54).

Claims 1, 2, 5, 6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Nagy (US 6,356,619).

Regarding Claim 1, Nagy teaches an x-ray tube comprising: (a) a vacuum enclosure (Column 3, line 3); (b) means for emitting electrons (14) according to a predetermined emission profile, the means for emitting electrons according to a predetermined emission profile being substantially disposed within the vacuum enclosure (Column 5, lines 36-41); and (c) an anode (20) positioned within the vacuum enclosure so as receive electrons emitted by the means for emitting electrons according to a predetermined emission profile.

Regarding Claim 2, Figure 12 of Nagy teaches the x-ray tube as recited in Claim 1, wherein the means for emitting electrons according to a predetermined emission profile comprises a filament (60) and a cathode cup (58) including two walls which cooperate to at least partially define a slot wherein the filament is at least partially disposed, a distance between the filament and the at least one wall varying along at least a portion of the longitudinal length of the filament.

Regarding Claim 5, Nagy teaches the x-ray tube as recited in Claim 2, wherein the at least two walls of the slot are of substantially the same shape and are symmetrically disposed with respect to the filament (Figures 12-15).

Regarding Claim 6, Nagy teaches the x-ray tube as defined in Claim 2, wherein the slot further comprises a bottom surface, and wherein the at least two walls are perpendicularly disposed with respect to the bottom surface (Figures 13-15).

Regarding Claim 8, Nagy teaches the x-ray tube as recited in Claim 2, wherein the means for emitting electrons according to a predetermined emission profile comprises a filament configured such that at least one of the properties of the filament varies along at least a portion of a longitudinal length of the filament, wherein the properties of the filament are pitch (Figure 12).

Claims 11-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Hosokawa (JP 402239555).

Regarding Claim 11, Hosokawa teaches a cathode assembly suitable for use in an x-ray device, the cathode assembly comprising: (a) a base portion (4); (b) a cathode cup (5, 4c) attached to the base portion, the cathode cup including at least two walls which cooperate to at least partially define a slot; and (c) a filament (41) disposed substantially within the slot (Figures 18 and 6).

Regarding Claim 12, Hosokawa teaches the cathode assembly as recited in claim 11, wherein the filament comprises a helically wound wire having at least two different diameters (Figure 6).

Regarding Claim 13, Hosokawa teaches the cathode assembly as recited in claim 11, wherein the filament defines at least two different pitches (Figure 6).

Regarding Claim 14, Hosokawa teaches the cathode assembly as recited in claim 11, wherein the filament defines at least two different diameters (Figure 6).

Regarding Claim 15, Hosokawa teaches the cathode assembly as recited in claim 11, wherein the slot at least partially defined by the walls of the cathode cup has a cross sectional area that varies along at least a portion of a length of the slot (Figure 5B).

Regarding Claim 16, Hosokawa teaches the cathode assembly as recited in claim 11, wherein the slot at least partially defined by the walls of the cathode cup has a cross sectional area that varies along at least a portion of a length of the slot (Figure 5B), and wherein at least one of the properties of the filament varies along at least a portion of a longitudinal length of the filament, the properties of the filament being selected from the group consisting of: filament wire diameter, pitch, filament diameter (Figure 6).

Regarding Claims 17-22, Figure 6 of Hosokawa teaches in an x-ray tube (Figure 18) having a filament (41) of predetermined longitudinal length, a method for producing an electron stream having a predetermined electron density profile, the method comprising: (a) applying a predetermined electric current to the filament so as to cause emission of electrons by the filament (Abstract); (b) varying, with respect to the longitudinal length of the filament, the rate at which electrons are emitted by the filament (Constitution); and (c) accelerating at least some of the emitted electrons toward a focal spot (3) located at a predetermined distance from the filament; wherein varying the rate at which electrons are emitted comprises varying an electrical field strength in selected areas proximate the filament; and wherein varying the rate at which electrons are

emitted comprises heating the filament in such a way that some portions of the filament are at a relatively higher temperature than other portions of the filament.

Claims 23, 24 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Zabel (US 2,479,193).

Regarding Claims 23, 24 and 26, Figure 3 of Zabel teaches a filament for use in the cathode of an x-ray tube, the filament having a longitudinal length and being disposed in a slot defined in the cathode, the filament comprising: (a) a wire wound into successive coils to form a helix, the helix comprising a middle portion and first and second end portions, wherein at least one of a group of properties varies along at least a portion of a longitudinal length of the filament, the group of properties consisting of: wire diameter, pitch, filament diameter; and (b) first and second electrical leads (5), the first electrical lead being attached to the first end portion of the helix, and the second electrical lead being attached to the second end portion of the helix, wherein the pitch is greatest in the middle portion of the helix, and wherein the filament diameter is greatest in the middle portion of the helix. Zabel teaches the device since the intended use of a device is not germane to the device itself. Also, it is understood that the various properties of the articulated cathode can vary along the length of the helix to have greatest pitch or diameter in a middle portion.

Claims 27-29 rejected under 35 U.S.C. 102(b) as being anticipated by Dowd (US 4,894,853).

Regarding Claims 27-29, Figure 3 of Dowd teaches a cathode cup suitable for use in conjunction with a filament, the cathode cup comprising: at least two integral

walls (left and right sides of filament (68)) that cooperate to define a slot of predetermined length, the slot having a cross-sectional area that varies along at least a portion of the predetermined length; and first and second dielectric support posts (72), wherein the slot is wider at one (upper) end than at the other (lower) end or wherein the slot is wider at both (upper) ends (at approximately item 75) than in the middle (at approximately item 73).

Allowable Subject Matter

Claims 3 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 3 contains allowable subject matter for at least the reason that the prior art of record fails to teach or reasonably suggest an x ray tube comprising a vacuum enclosure with an anode and a filament and a cathode cup including two walls which cooperate to at least partially define a slot wherein the filament is at least partially disposed, a distance between the filament and the at least one wall varying along at least a portion of the longitudinal length of the filament and wherein the distance between said filament and at least one of the at least two walls is at a minimum proximate a middle portion of the filament as claimed. While a variation along a longitudinal length is taught, as set forth above, it is not combined or suggested with a distance at a minimum proximate a middle portion of a filament as claimed.

Claim 25 contains allowable subject matter for at least the reason that the prior art of record fails to teach or reasonably suggest a filament comprising a wire wound

Art Unit: 2882

into successive coils to form a helix, the helix comprising a middle portion and first and second end portions wherein the wire diameter is greatest in a middle portion of the helix and electrical leads, as claimed. While art such as Marks (US 5,756,998) teaches filament diameter variations, Marks and the prior art do not suggest placing areas of greatest diameter particularly in a middle of a coiled wire helix as set forth above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lipkin (US 6,259,193), Uematu (US 4,866,749) and Braunsdorff (US 2,454,765) are of interest for teaching variations in filaments. Weigl (US 4,315,154) is of interest for teaching variations in both filaments and cathode cups.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krystyna Suchecki whose telephone number is (571) 272-2495. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2882

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KS



Craig E. Church
Primary Examiner